State of California
AIR RESOURCES BOARD

Research Screening Committee Meeting
Cal/EPA Headquarters Building
1001 I Street
Conference Room 510
Sacramento, California 95814
(916) 445-0753

January 11, 2007
9:00 a.m.

ADVANCE AGENDA

Draft Final Reports

1. "Evaluation of Mechanisms of Exhaust Intrusion into School Buses and Feasible Mitigation Measures," University of California, Riverside, $299,999, Contract No. 03-343

School buses appear to be especially prone to having a fraction of their own exhaust re-enter the cabin ("self-pollution"). While this fraction is by itself small, the effect on bus cabin concentrations can be very significant, sometimes resulting in high exposures to the children on board. This study was an attempt to see if self-pollution by school buses can be reduced or eliminated by better sealing of buses, positively pressurizing the bus cabin, raising the exhaust pipe height, or a combination of these methods. Of the methods tested, only raising the height of the tailpipe consistently reduced self-pollution during both driving and idling, although it did not appear to eliminate it altogether.

Due to structural and safety requirements for buses, it is doubtful that raising buses' exhaust is a reasonable retrofit measure, although it might be considered in new bus design. This means the primary means of reducing the impacts of self-pollution will continue to be indirect—reducing tailpipe emissions themselves by encouraging accelerated school bus fleet turnover and/or particle trap retrofits through grants and other incentives. In addition, previous recommendations warning against close bus-on-bus following were strongly supported by the measurements made in this study when self-pollution was measured against the effect of following another bus.

2. "Analysis of GPS-based Data for Light Duty Vehicles," University of California, Riverside, $25,000, Contract No. 04-327

ARB's mobile emissions model, EMFAC, depends on accurate activity data (e.g., vehicle miles traveled, number of trip starts, etc.) to calculate emissions inventories. One means of collecting vehicle activity data is to equip selected vehicles with on-board data loggers that include Global Positioning Systems (GPS) receivers. GPS data permit

a detailed analysis of typical vehicle operating parameters such as trip duration and average speed, and also permit analysis of spatial parameters, such as highway versus surface streets. GPS data collected from a total of 739 households in two separate studies were analyzed for this project. The results from this analysis indicate that the average trip length is relatively short (4-7 miles), the number of daily trips is about five per day, and more vehicle miles traveled (VMT) occur on highways (55-65 percent) than surface streets, but a smaller fraction of time is spent on highways (35-45 percent). These data will be used to improve the spatial and temporal resolution of the EMFAC model.